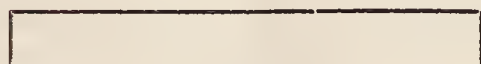


with a sketch of the history of the

RAWMARSH
Urban District Council.



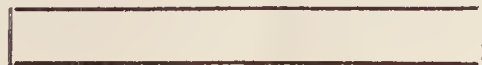
THE MEDICAL OFFICER'S
ANNUAL REPORT,

FOR THE YEAR 1906,

BY

JAMES PICKEN, M.B., C.M.,

MEDICAL OFFICER OF HEALTH.



ROTHERHAM :
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ANNUAL REPORT FOR 1906.

To the Chairman and Members of the Rawmarsh Urban District
Council.

GENTLEMEN,

I beg to submit for your consideration my report for 1906 on the health and sanitary condition of the parish, and I regret to have to state that the death-rate compares very unfavourably with that of 1905, which was the lowest recorded.

Calculated on the deaths registered in the district, the death-rate for the year is 17.61 per thousand inhabitants, against 13.46 for 1905. The birth-rate, like that of the whole country, is again the lowest recorded, being 34.79 per thousand inhabitants against 34.82 for 1905, and 27.0 for the whole country for 1906.

The corrected death-rate, which includes the deaths of residents of the parish, removed through sickness or infirmity to institutions outside the district, is 18.82, against 14.38 for the previous year, and is 2.2 above the average for the previous five years. This rate, instead of being as in 1905, lower than all the average death-rates in the Registrar's General's Returns, as seen in Table VII., is 2.9 above the highest of these rates, that for the 76 great towns, which is 15.59.

I am sorry to say that the gratifying reduction recorded last year in the infantile mortality and zymotic death-rates has not been maintained. Although well below the highest recorded rates they are both unpleasantly high, due almost entirely to the increased number of deaths from diarrhoea.

HOUSES, POPULATION, &c.

Fifty-two new houses were built and occupied during the year, 25 in Rawmarsh and 32 in Parkgate, a total of 52, against 94 for 1905.

I estimate the population of the parish for 1907 at 16,760.

TABLE I.

	Rawmarsh	Parkgate.	Whole Parish.
Acreage, 1891	—	—	2549
Acreage, 1906	—	—	2549
Number of Houses built and occupied during 1906	20	32	52
Number of Houses built and occupied at the end of 1906	1429	1923	3352
Population at Census, 1901	7210	7377	14587
Population estimated to the middle of 1906	6965	9445	16410
Population estimated to the middle of 1907	7145	9615	16760

VITAL STATISTICS.

BIRTHS.

Five hundred and seventy-one births (275 males and 296 females) were registered during the year, being seven more than in 1905, and giving a birth-rate of 34.79 per thousand inhabitants, against 34.82 for 1905, and 27.0 for England and Wales for 1906.

There were 23 illegitimate births (7 males and 16 females) registered, 6 in Rawmarsh and 17 in Parkgate, against 21 for 1905.

TABLE II.

Showing the births and birth-rate for the year for each district and for the whole parish.

District.	Population.	Births			Birth Rate per 1000 per annum.
		Males.	Females.	Total.	
Rawmarsh ..	6965	117	107	224	32.16
Parkgate	9445	158	189	347	36.67
Whole Parish	16410	275	296	571	34.79

TABLE III.

Showing the births and birth-rate for the Parish for each quarter and for the whole year.

QUARTER.	Births.	Birth Rate per 1000 per Annum.
First Quarter	140	34·12
Second „	143	34·85
Third „	146	35·58
Fourth „	142	34·61
Whole year.....	571	34·79

DEATHS.

Two hundred and eighty-nine deaths (159 males and 130 females) were registered in the district during the year, being 71 more than in 1905, and giving a death-rate of 17·61 per thousand inhabitants, against 13·46 for 1905. Twenty deaths of persons belonging to the parish occurred in institutions outside the district, viz., eight in Rotherham Workhouse, eleven in Rotherham Hospital, and one in Wadsley Asylum, making a total of 309 deaths for the year, and equal to a rate of 18·82 per thousand inhabitants, against 14·38 in 1905.

The mortality of infants under one year is 46 per thousand births registered more than in 1905, against an increase of 5 for the whole of England and Wales. One hundred and twelve were registered, against 85 during the previous year, equal to a mortality of 196 per thousand births registered, against 150 for 1905. This is 63 per thousand births registered more than for the whole of England and Wales, and 80 higher than for the whole of England and Wales less 218 towns, as compared with 22 and 37 respectively for 1905, and is 14 above the average of the parish for the previous ten years. The causes of the infantile deaths were as under, and for comparison I give the corresponding figures for :—

	1906.	1905.
Measles	7	0
Scarlet Fever	1	0
Whooping Cough	2	1
Diarrhœa	37	14
Enteritis	3	2
Premature Birth	11	22
Congenital Defects	3	3
Wasting Diseases	14	16
Tubercular Diseases	3	3
Syphilis	0	2
Meningitis	1	2
Convulsions	12	5
Bronchitis	4	5
Laryngitis	0	1
Pneumonia	5	6
All other causes	6	3
	<hr/> 112	<hr/> 85

It will be seen that compared with 1905 the increase in the infant mortality is chiefly due to Measles, Diarrhœa, and Convulsions.

More than double the number for 1905 died in 1906 between the ages of one and five, the figures being 30 and 69, this large increase being due to Measles and Diarrhœa.

Eighteen deaths occurred between 5 and 15 years of age, against eight in 1905, this large increase being mainly caused by Measles and Scarlet Fever.

From 15 years upwards the number of deaths is the same as for the previous year. Thirty-five persons died over 70 years of age, the average age for these being $75\frac{1}{2}$ years.

The mortality from Bronchitis and Pneumonia is 1.64 per thousand inhabitants, as compared with 2.4 for 1905. Seven under 5 years of age died of Pneumonia, and none from Bronchitis.

Seventeen persons died of Phthisis Pulmonalis, giving a death-rate of 1.09 per thousand inhabitants, against 0.61 for 1905. Eighteen died of other tubercular diseases, making a total of 35 from Tuberculosis, against 24, and equal to a death-rate of 2.13, against 1.4 for 1905.

There is a large increase in the number of deaths from the principal zymotic diseases, 98 being recorded, against 24 for 1905 (which was the lowest recorded), and giving a zymotic death-rate of 5.97 per thousand inhabitants, against 1.48 for the previous year, and 1.73 for the whole of England and Wales.

Diarrhœa and Measles are mainly accountable for this high zymotic death-rate.

Ten accidental deaths against six in 1905 were registered. Four were caused by accidents at collieries, one at Parkgate Iron and Steel Works, two by burns, one by an accidental fall, one by drowning, and one was due to an accident at a level crossing. Since making my calculations and drawing out my tables I find that the level crossing referred to is in Greasbro' parish, and this accidental death should have been included in the Registrar's returns for that parish.

TABLE IV.

Showing the deaths and death-rate for the year for each District and for the whole Parish.

District	Popula- tion	DEATHS.			Death rate per 1000 per annum
		Males	Females	Totals	
Rawmarsh	6965	74	50	124	17·80
Parkgate	9445	100	85	185	19·58
Whole Parish	16410	174	135	309	18·82

TABLE V.

Showing the deaths and death-rate for the Parish for each quarter and for the whole year.

QUARTER.	Deaths	Death rate per 1000 per annum.
First Quarter... .	65	15·84
Second „	64	15·66
Third „	67	16·33
Fourth „	113	27·54
Whole Year	309	18·82

The following tabular statement shows the Zymotic Diseases referred to, and the number of deaths and rates of mortality caused by them in each district during the years 1905 and 1906.

TABLE VI

	1906.				1905.			
	Raw-marsh.	Park-gate.	Hos-pital.	Whole Parish	Raw-marsh.	Park-gate.	Hos-pital.	Whole Parish
Cholera.....	...	...	...	...	...	...	...	...
Small-pox.....	...	...	...	...	...	...	...	...
Scarlatina.....	2	2	4	8	1	1	...	2
Measles.....	4	30	...	34	...	1	...	1
Diphtheria .....	...	...	...	...	...	2	...	2
Croup .....	...	...	...	...	...	...	...	...
Whooping Cough	4	3	...	7	1	...	...	1
Typhoid Fever...	...	2	...	2	2	...	...	2
Diarrhœa	15	32	...	47	2	14	...	16
Total.....	25	69	4	98	6	18	...	24
Zymotic Death-rate per 1000 per annum ...	3.59	7.30	...	5.97	0.88	1.91	...	1.48

TABLE VII.

Showing the Birth-rate, Death-rate, Zymotic Death-rate, and Infant Mortality for the whole Parish and for England and Wales, etc., for the year 1906.

1906.	Parish of Rawmarsh.	England and Wales.	Great towns (76)	Smaller towns (142)	England and Wales, less (218) towns
Birth-rate	34.79	27.0	27.9	26.5	26.3
Death-rate	18.82	15.4	15.9	14.5	15.1
Zymotic Death-rate ...	5.97	1.73	2.24	1.71	1.18
Infantile Mortality	196	133	145	138	116
(per 1000 births regist'd.)					

TABLE VIII. (Table IV. of the Local Government Board).

Causes of, and Ages at, Death during Year 1906, and the District in which they occurred.

CAUSES OF DEATH.	DEATHS IN OR BELONGING TO WHOLE DISTRICT AT SUBJOINED AGES.							DEATHS IN OR Belonging to LOCALITIES (at all Ages).		Total Deaths whether of " residents " or " Non- residents " in Public Institutions in the District.
	All Ages.	Under 1.	1 and under 5.	5 and under 15.	15 and under 25.	25 and under 65.	65 and up- wards.	Raw- marsh	Park- gate	
Measles	34	7	23	4	..	..	..	4	30	..
Scarlet Fever	8	1	4	3	..	..	..	4	4	4
Whooping-cough ..	7	2	5	..	..	..	..	4	3	..
Fever, Enteric.....	2	..	..	..	1	1	..	..	2	..
Epidemic Influenza..	2	..	..	..	..	..	2	1	1	..
Diarrhoea	47	36	11	..	..	..	..	15	32	..
Enteritis	5	3	2	..	..	..	..	5	..	..
Erysipelas..	1	..	..	..	..	1	..	1	..	..
Other Septic Diseases	3	..	..	1	..	2	..	1	2	..
Phthisis.....	17	..	..	1	5	10	1	6	11	..
Other Tubercular Dis- eases	18	5	9	2	..	2	..	9	9	..
Cancer,malignant dis- ease	2	..	..	..	..	1	1	1	1	..
Bronchitis.....	9	4	..	..	..	2	3	5	4	..
Pneumonia	18	5	7	1	..	4	1	9	9	..
Other diseases of Res- piratory Organs....	1	..	1	..	..	..	..	1	..	..
Premature Birth....	11	11	..	..	..	..	..	4	7	..
Diseases and accident of Parturition	3	..	..	..	..	3	..	1	2	..
Heart diseases.....	11	..	..	..	..	7	4	7	4	..
Accidents	10	..	..	2	2	4	2	3	7	..
All other causes	100	38	7	4	2	16	33	43	57	..
All causes	309	112	69	18	10	53	47	124	185	4

TABLE IX. (Table V. of the Local Government Board), RAW-MARSH DISTRICT.

Infantile mortality during the year 1906. Deaths from stated causes in weeks and months under one year of age.

CAUSE OF DEATH.	Under 1 Week.	1-2 Weeks.	2-3 Weeks.	3-4 Weeks.	Total under 1 Month.	1-2 Months.	2-3 Months.	4-5 Months.	5-6 Months.	6-7 Months.	7-8 Months.	8-9 Months.	9-10 Months.	10-11 Months.	11-12 Months.	Total Deaths under 1 Year.
Measles	1	..	..	1
Scarlet Fever	1	..	..	..	..	1
Whooping Cough....	1	..	..	..	..	..	1
Diarrhoea, all forms	2	1	3	2	2	1	1	..	..	1	13
Enteritis, Muco-Enteritis	1	..	..	1	..	..	1	..	3
Premature Birth	2	1	1	..	4	..	..	..	..	..	..	..	..	..	..	4
Congenital Defects ..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1
Atrophy, Debility, Marasmus	1	..	..	1	2	..	..	..	..	..	..	2	..	..	5
Tuberculous Meningitis	1	..	..	1
Other Tuberculous Diseases	1	1
Meningitis (not tuberculous).....	1	..	..	..	..	..	1
Convulsions	1	..	..	1	1	..	1	..	..	..	..	..	..	..	3
Bronchitis	1	1	..	..	..	..	..	..	..	2
Pneumonia	1	1	..	..	..	..	..	..	2
Other Causes.....	1	..	1	..	..	..	1	..	3
	3	3	1	..	7	5	2	8	3	5	3	1	4	2	2	42

TABLE X. (Table V. of the Local Government Board), PARK-GATE DISTRICT.

Infantile mortality during the year 1906. Deaths from stated causes in weeks and months under one year of age.

CAUSE OF DEATH.	Under 1 Week	1-2 Weeks.	3-4 Weeks.	Total under 1 Month.	1-2 Months.	2-3 Months.	3-4 Months	4-5 Months.	5-6 Months.	6-7 Months.	7-8 Months.	8-9 Months.	9-10 Months.	10-11 Months.	11-12 Months.	Total deaths under One Year.
Measles .....	..	..	..	..	..	1	..	1	..	..	..	..	3	..	1	6
Whooping Cough.....	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1
Diarrhœa, all forms.....	..	1	..	1	1	3	3	2	2	2	2	2	2	2	2	24
Premature Birth	6	1	..	7	..	..	..	..	..	..	..	..	..	..	..	7
Congenital Defects.....	1	..	1	2	..	..	..	..	..	..	..	..	..	..	..	2
Atrophy, Debility, Marasmus	2	1	..	3	1	3	..	1	1	..	..	..	..	..	..	9
Tuberculous Meningitis .....	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	2
Tuberculous Peritonitis: Tabes Mesenterica ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1
Other Tuberculous Diseases .....	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
Convulsions	2	1	..	3	..	1	1	1	1	..	1	..	..	1	..	9
Bronchitis .....	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	2
Pneumonia .....	..	..	..	..	1	..	..	..	1	..	..	..	1	..	..	3
Other causes.....	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1	3
	11	4	1	16	4	9	4	6	6	2	3	5	6	5	4	70

TABLE XI.

YEAR.	Population estimated to Middle of each Year.	BIRTHS.		TOTAL DEATHS REGISTERED IN THE DISTRICT.				Total Deaths in Public Institu- tions in the District. 9	Deaths of Residents registered in Public Institu'tions beyond the District. 10	NETT DEATHS AT ALL AGES BELONGING TO THE DISTRICT.	
		Number.	Rate.	Under 1 Year of Age		At all Ages.				Number.	Rate.*
				Number.	Rate per 1000 Births registered	Number.	Rate.				
1	2	3	4	5	6	7	8	9	10	11	12
1896	13358	528	39.59	83	176	213	15.95				
1897	13608	507	37.25	89	175	255	18.73				
1898	13868	591	42.61	96	162	255	18.38				
1899	14129	501	35.88	103	205	267	18.89				
1900	14387	609	42.32	127	208	260	18.07				
1901	14647	560	38.23	116	207	270	18.43		11	281	19.18
1902	15007	573	38.18	101	176	245	16.32		16	261	17.39
1903	15315	627	40.93	110	175	240	15.67		6	246	16.06
1904	15995	561	35.07	105	187	243	15.19		15	258	16.13
1905	16195	564	34.82	85	150	218	13.46		15	233	14.38
Averages for: years 1896-1905.	14650	562	38.48	101	182	246	16.90				
1906	16410	571	34.79	112	196	289	17.61	4	20	309	18.82

TABLE XII.

YEAR.	NAMES OF LOCALITIES.							
	RAWMARSH.				PARKGATE.			
	Population esti- mated to middle of each year.	Births regis- tered.	Deaths at all Ages.	Deaths under 1 year.	Population esti- mated to middle of each year.	Births regis- tered.	Deaths at all Ages.	Deaths under 1 year.
1896 ..	6099	195	93	...	7249	333	120	...
1897 ..	6326	212	102	...	7282	295	153	...
1898 ...	6553	221	136	...	7315	280	131	...
1899 ...	6780	261	120	...	7348	330	134	...
1900 ...	7007	265	113	51	7381	344	147	76
1901 ..	7235	264	113	48	7412	296	168	68
1902 ...	7465	255	129	52	7542	318	132	49
1903 ...	7680	254	110	46	7635	373	136	64
1904 ..	8010	229	112	45	7985	332	146	60
1905 ...	6815	206	96	35	9380	358	137	50
Averages of Years 1896 to 1905.	6997	236	112	27	7652	325	140	36
1906 ...	6965	224	124	42	9445	347	185	70

TABLE XIII.

Showing the ages at which the 309 Deaths occurred.

	Hospital	Rawmarsh	Parkgate	Whole Parish
Under 1 Year .....	...	42	70	112
1 and under 5	2	18	49	69
5 ,, 15	2	5	11	18
15 ,, 25		4	6	10
25 ,, 65	...	26	27	53
65 and upwards	...	27	20	47
Total	4	122	183	309

TABLE XIV.

Showing the natural increase in the population by Births over Deaths.

	Rawmarsh	Parkgate	Whole Parish
Births	224	347	571
Deaths	124	185	309
Increase	100	162	262

SICKNESS.

SCARLET FEVER.—Scarlet Fever was more prevalent than it has been for a good many years. One hundred and fifty were reported, 100 in Rawmarsh and 50 in Parkgate, against 50 for the whole parish in 1905. As will be seen from the subjoined table it was with us all the year round. It was distributed all over the parish throughout the year. but was always more prevalent in Rawmarsh. The first cases at the Haugh were in a house where seven occurred, and the disease was imported from a neighbouring district. Infection from outside districts was also accountable for cases in other parts of the parish. Injudicious communication with infected houses was found to be the cause of a good many. A principal source was the day schools, and mostly through slight unrecognised cases sent back to school after a few days' illness. I am afraid the constant and severe pressure brought to bear on parents by the school authority when a child is a day or two absent must bear some of the responsibility for this, and this opinion applies to other infectious diseases besides.

The disease seems to be getting gradually more severe in type, and there were some virulent cases during the year. Eight deaths occurred—four of them in the Isolation Hospital—the highest mortality that has been recorded for a good many years. The percentage of deaths in the Hospital was 4.7, against 6.1 outside ; that is, had all the cases been treated inside the Hospital there would have been, at this rate of mortality, seven deaths for the year, and had they all been treated at their homes there would have been nine deaths.

The following table shows the number of cases and their distribution, as to time and locality, and the number removed monthly to the Isolation Hospital from each locality :—

TABLE XV.

	Rawmarsh.	Parkgate.	Whole Parish.	Removed to Hospital.		
				Rawmarsh.	Parkgate.	Whole Parish
January ..	7	4	11	5	4	9
February ..	5	3	8	4	2	6
March	4	1	5	3	1	4
April	7	2	9	2	3	5
May	16	6	22	11	3	14
June	7	6	13	6	3	9
July	5	2	7	4	..	4
August	8	6	14	5	4	9
September	1	3	4	..	1	1
October ..	11	3	14	4	1	5
November..	21	5	26	7	3	10
December	8	9	17	4	5	9
Total ..	100	50	150	55	30	85

MEASLES.—Measles appeared in August, and for a fortnight seemed to be subsiding. It increased in September, and in October I reported as follows to the Local Government Board and the County Council :—

“ I beg to report that Measles, which had become epidemic in the parish, seemed a fortnight ago to be subsiding. Lately, however, it has considerably increased in prevalence, the principal centres of infection being the Infant Departments of the Schools.

“ There has not been a considerable prevalence of Measles in the parish for several years, and consequently there were a great many children susceptible to the disease.

“ On the 25th inst. I advised the Chairman of the Council and the Chairman of the Sanitary Committee to close the Infant Departments of all the schools in the parish.”

On October 30th I again wrote to the Local Government Board and the County Medical Officer that I had advised the closing of the whole of the Haugh School, as there was a considerable number of cases of Measles among scholars of that school not belonging to the Infants' Department.

When the infant departments were re-opened, after three weeks' closure, the epidemic seemed to be ended, but it soon began to increase again at Rawmarsh and Ryecroft. The infant departments were again closed there for one month, including the Christmas holidays, and by that time the disease had disappeared. Thirty-four deaths were the result of this, the most serious epidemic of Measles which has visited the parish for a long time, and is one of the principal causes of the high death-rate for the year. Seven of the deaths were under one year, 23 between one and five, and four between five and fifteen years of age.

ENTERIC FEVER.—Nine cases of Enteric Fever were reported during the year, one in Rawmarsh and eight in Parkgate. This is much below the average for the previous ten years. One case was at a Canal lock house, where there have been other cases in former years, and probably due to the foul condition of the Canal. No definite cause could be found for the other eight cases.

DIARRHŒA.—The deaths from Diarrhœa were distributed throughout the year as follows :—Three in February, one each in March, June, and July, seven in August, sixteen in September, fourteen in October, and four in November. The seasonal prevalence extended over a longer period than usual, gradually increasing from the beginning of July to the end of September, and declining to the end of October. The mortality is unusually high, 47 deaths being registered as due to it, and is the principal factor in the high death-rate for the year. Thirty-six of the deaths were of infants under one year, and eleven were of children between one and five years of age. Fifteen occurred in Rawmarsh and 32 in Parkgate, and these figures indicate approximately the respective prevalence in the two localities. Last year I also reported a disproportionate mortality and incidence of the disease in the two districts. Of the fifteen houses in which deaths occurred in Rawmarsh, thirteen are provided with privies and ashpits, and only two with w.c.'s. The corresponding figures for Parkgate are thirty and two. The surface of the great majority of the back yards of these houses, although paved a few feet from the back doors, consists of soil which has received a sprinkling of ashes when the houses were built, and has been contaminated for years with a great variety of animal and vegetable refuse, and by the emptying of privies and ashpits. There is a denser population and a larger proportionate number of such common backyards in Parkgate than in Rawmarsh. While ignorance and carelessness in the artificail feeding of infants deserve all the blame attached to them as causes of summer diarrhœa, I do not think the disease will ever be satisfactorily

grappled with, or the mortality reduced to the lowest possible minimum till such conditions as I have referred to are entirely altered. With a clean environment in house and backyard the possibilities for the contamination of food, and especially milk, which is the chief cause of summer diarrhoea, would be greatly minimised.

DIPHTHERIA.—Thirteen cases of Diphtheria, six in Rawmarsh and seven in Parkgate, were reported, against a similar number in 1905. No deaths was caused by it. One was associated with an untrapped drain near the door of the house; one with an untrapped drain in the cellar; one with a choked drain; and four were in the area of a choked sewer.

WHOOPING COUGH.—This disease became prevalent in March, and continued so till the end of June, when it gradually declined, and disappeared at the beginning of September. Considering its prevalence the mortality was low, only seven deaths being caused by it, four in Rawmarsh and three in Parkgate.

INFLUENZA.—There were some cases of Influenza in February, and a considerable number in March, but it then rapidly disappeared. There were again some in July. The last quarter of the year was unusually free from it. Two deaths are directly referred to it.

LEAD POISONING.—Several cases of lead poisoning in married women, due to taking diachylon or pills containing lead, again came to my knowledge during the year.

TABLE XVI. (Table III. of the Local Government Board). Cases of Infectious Disease notified during the Year 1906.

NOTIFIABLE DISEASE.	CASES NOTIFIED IN WHOLE DISTRICT.							Total Cases notified in each Locality.		No. of Cases re-moved to Hospital from each Locality.	
	At all Ages.	At Ages—Years.					65 and upwards				
		Under 1	1 to 5	5 to 15	15 to 25	25 to 65		65 and upwards			
Diphtheria ...	13	...	6	3	3	1	...	6	7	...	...
Erysipelas ...	24	...	...	...	...	20	4	8	16	...	...
Scarlet fever ...	150	3	52	88	3	4	...	100	50	55	30
Enteric fever ...	9	...	...	4	1	4	...	1	8	...	...
Totals ...	196	3	58	95	7	29	4	115	81	55	30

WATER SUPPLY.

During the month of May the water supply was entirely cut off on several occasions owing to the laying of a new main on the new Rotherham Road Bridge. With that exception the supply was adequate during the year, except, of course, in the high level districts, where there was the same intermittent service which I have so often previously reported. It is really surprising that the inhabitants of these districts so quietly submit year after year to the dangers and inconvenience of such an uncertain supply.

Owing to the analyst's reports (see Nos. 16, 17, 18, 19, 20, and 21) on samples of water supplied by the Council, I had an interview with the Chairman, and suggested the issuing of hand bills advising consumers to boil the water before using it for drinking or domestic purposes. I also advised that the results of the analyses should be communicated to the Rotherham Authority, and permission asked to take samples for analysis from the Rotherham district, and near the boundary, for purposes of comparison, and to find out whether the contamination was taking place in Rawmarsh district. The result was the analyses numbers 22 and 24, 23, and 25 ; and I reported to you as follows :—

“The analyst having given a favourable opinion of the samples of water taken in Rotherham district, immediately outside Rawmarsh Boundary, I now wish to draw your attention to the following reports dated October 29th :—

NO. 18.—SAMPLE TAKEN FROM A TAP AT ROTHERHAM ROAD STATION.—“This water is polluted with surface drainage containing decomposing nitrogenous organic matter, and on this account it is unsafe for drinking purposes. It shows no signs of oxidised or unfiltered sewage, and if the entrance of the surface water could be prevented it should be an excellent water for drinking and domestic use.”

NOS. 19 AND 21.—SAMPLES TAKEN FROM THE HOUSE AT ROTHERHAM ROAD STATION, AND A HOUSE AT THE TOP OF HIGH STREET, RAWMARSH.—“The waters contain an appreciable amount of surface drainage, and on this account are not safe for drinking purposes, as a water receiving its contamination from such a source, may, under certain conditions, become grossly polluted. As these are free from unfiltered sewage, a removal of the surface pollution would render them well suited for domestic and drinking purposes.”

NO. 20.—SAMPLE TAKEN FROM A HOUSE IN MAIN STREET, RYECROFT.—“In the absence of any information as to the source, the chemical data only enables one to give a rather dubious opinion in regard to this sample. The nitrogenous matters are somewhat

larger than one expects to find in pure waters, and yet this matter may be purely of vegetable origin. In any case a little surface water seems to be present, and this ought to be eliminated."

These are the opinions of the same analyst who gave the favourable reports already referred to, and taken together they plainly indicate that contamination of the samples took place in the Rawmarsh district. I have to remind you that the supply of water to the higher districts is often intermittent, and when the mains there are empty or under very low pressure, serious surface impurities may gain entrance to the pipes by insuction. In fact, this is one of the well-known dangers of an intermittent water supply.

The matter requires further investigation, and I think other samples for analysis should be taken at varying periods in different parts of the district. The water is very turbid, and I think careful systematic flushing of the mains should be carried out, and record kept, and special attention should be given to keeping the hydrants perfectly clean and in good order.

I think it safer for consumers in Rawmarsh to boil the water before using it for drinking and domestic purposes, until the source and distribution of the contamination have been definitely ascertained. "

One hundred and fourteen millions, five hundred and eighty-one thousand, five hundred gallons were consumed during the year, equal to about $19\frac{1}{2}$ gallons per head of the population per day, against $17\frac{1}{3}$ gallons for 1905.

County Analyst's Office, Bradford,

October 16th, 1906.

Analytical report upon two samples of water from Rawmarsh.

No. 1 sample, taken from 128, Main street, Ryecroft; No. 2 sample, taken from the Great Central Station.

Grains per gallon:—

Total Solid Matters	...	...	...	10.0	...	10.0
Chlorine (combined)	...	...	...	.7	...	.7
Nitrates	...	...	...	none	...	none
Nitrogen as Nitrates	...	...	...	.224	...	.224
Free Ammonia	...	...	...	.0014	...	.0028
Albuminoid Ammonia	...	...	...	.0042	...	.0112
Lead	...	...	...	none	...	none
Total Hardness (Clark's Scale)	...	...	...	2.5	...	2.5

These are almost identical in several particulars they are both exceedingly soft and have both received an appreciable amount of drainage from such a source as cultivated land, but this has become oxidised during transit. No 1 is organically pure and quite suitable for drinking purposes. No. 2 has become polluted with animal matters of non-human origin, and on this account is unfit for drinking. The difference between No. 1 and 2 consists in their being an undue proportion of unchanged nitrogenous matters in No. 2, as compared with No. 1.

F. W. RICHARDSON.

County Analyst's Office, Bradford,

October 29th, 1906.

Analytical Report upon one sample of water from Raw-marsh.

Received October 24th, 1906.

No. 18: Tap near Porter's Room, Great Central, Rotherham Road Railway Station.

Total Solid Matters	...	...	...	...	13.0
Chloride (combined)	...	...	...	...	.5
Nitrites	...	...	...	...	None
Nitrogen as Nitrates	...	...	...	...	None
Free Ammonia	...	...	...	...	.0035
Albuminoid Ammonia	...	...	...	...	.0077
Lead	...	...	...	...	None
Total Hardness (Clark's Scale)	...	...	...	...	3.2

This water is polluted with surface drainage containing decomposing nitrogenous organic matter, and on this account it is unsafe for drinking purposes. It shows no signs of oxidised or infiltrated sewage, and if the entrance of the surface water could be prevented it should be an excellent water for drinking and domestic use.

F. W. RICHARDSON.

County Analyst's Office, Bradford,

October 29th, 1906.

Analytical Report upon two samples of water from Raw-marsh U.D.C., received October 24th, 1906.

No. 19 taken at House, Rotherham Road Station, Great Central Railway. No. 21 taken at House, 56, High Street; occupier, Mrs. Garbutt.

Total Solid Matters	...	...	9.0	...	8.0
Chloride (Combined)	...	...	.3	...	.4
Nitrites	...	...	None	...	None
Nitrogen as Nitrates	...	...	None	...	None
Free Ammonia	...	...	.0028	...	.0014
Albuminoid Ammonia	...	...	.0070	...	.0084
Lead	.....	...	None	...	None
Total Hardness (Clark's Scale)	...		2.8	...	2.3

These waters contain an appreciable amount of surface drainage, and on this account are not safe for drinking purposes, as a water receiving its contamination from such a source may under certain conditions become grossly polluted. As these are free from infiltrated sewage a removal of the surface pollution would render them well suited for domestic and drinking purposes.

County Analyst's Office, Bradford,

October 29th, 1906.

Analytical Report upon one sample of water from Rawmarsh Urban District Council, received on October 24th, 1906.

No. 20, taken at 160, Main Street, Ryecroft; occupier, Thomas Beckett.

Total Solid Matters	...	...	...	...	10.0
Chlorine (Combined)	...	...	...	...	.5
Nitrates	...	...	...	...	none
Nitrogen as Nitrates	...	...	...	...	none
Free Ammonia	...	...	...	...	.0021
Albuminoid Ammonia	...	...	...	...	.0056
Lead	...	...	...	...	none
Total Hardness (Clark's Scale)	...	...	...	...	2.8

In the absence of any information as to the source the chemical data only enable one to give a rather dubious opinion in regard to this sample. The nitrogenous matters are somewhat larger than one expects to find in pure waters, and yet this matter may be purely of vegetable origin. In any case a little surface water seems to be present, and this ought to be eliminated.

F. W. RICHARDSON.

County Analyst's Office,

November 7th, 1906.

Analytical report upon two samples of water from Rawmarsh Urban District Council.

No. 22 and 24, drinking water, Watt and Ferguson, taken 11-25 a.m., October 31st, 1906; and Rotherham Road Station, taken 11-35 a.m., October 31st, 1906.

Grains per gallon:—

Total Solid Matters	...	...	4.6	...	6.0
Chloride (combined)	...	...	.5	...	.5
Nitrates	...	...	None	...	None
Nitrogen as Nitrates	...	...	None	...	None
Free Ammonia	...	...	.0021	...	.0007
Albuminoid Ammonia	...	...	.0047	...	.0095
Lead	...	...	None	...	None
Total Hardness (Clark's Scale)	...	...	2.3	...	2.8

These waters are exceedingly soft; in fact, so much so that there will be a danger of their acting upon bright lead surfaces.

No. 22 is organically pure.

No. 24 contains rather more organic nitrogen than one expects to find in the best waters, but this is evidently of vegetable origin; so that both waters may be regarded as excellent for human use; neither shows the slightest signs of what is known as a past sewage contamination.

F. W. RICHARDSON.

Public Analyst's Laboratory,

67, Surrey street, Sheffield.

Report of a sample of drinking water received from the Rawmarsh Urban District Council, on October 31st, 1906. Sample mark, No. 23. Taken October 31st, Messrs. Watts and Ferguson, Mineral Water Factory, 11-25 a.m.

Physical character:—Suspended mater, none.

Appearance of a column, two feet long, slightly yellow; cloudy.

Taste, normal; odour, none.

On analysis, the sample gave the following results:—

Total Solid Matter, 7.92; which lost on ignition, 2.54 grs.

Chlorine, 0.80; equal to Sodium Chloride, 1.32 grs.

Nitrogen, in oxidised forms, none; equal to Nitric Acid (anhydrous), — grs.

Poisonous Metals (Lead, etc.), none.

Degrees of Hardness, 2.5. Each degree of hardness (grs. per gallon) represents a soap-destroying power equivalent to one grain of chalk per gallon.

Reducing Power, 3.05. Representing the Oxygen absorbed by the organic and other oxidisable matters in one milion parts of water.

Free and Ureal Ammonia, 0.05 parts per million.

Albuminoid Ammonia, 0.14 parts per million.

These results shows the sample to contain undesirable traces of readily-changeable organic matter, apparently of peaty or vegetable origin derived from the gathering ground. The appearance of the water is also attributable to the same cause.

In my opinion, the water would be materially improved by careful filtration.

G. E. SCOTT SMITH.

November 9th, 1906.

Public Analyst's Laboratory,

67, Surrey street, Sheffield.

Report on a sample of drinking water received from the Rawmarsh Urban District Council, on October 31st, 1906. Sample mark, No. 25. Taken from Great Central Rotherham Road Station tap, Porter's room, 11-25 a.m., October 31st, 1906.

Physical characters:—Suspended Matter, trace.

Appearance of a column, two feet long, slightly yellow; opaque.

Taste, normal; odour, none.

On analysis, the sample gave the following results:—

Total Solid Matter, 8.46; which lost on Ignition, 2.58 grs.

Chlorine, 0.80; equal to Sodium Chloride, 1.32 grs.

Nitrogen in oxidised forms, none; equal to Nitric Acid (anhydrous), — grs.

Poisonous Metals (Lead, etc.), none.

Degrees of Hardness, 2.1. Each degree of hardness represents a soap-destroying power equivalent to one grain of chalk per gallon.

Reducing Power, 3.65 Representing the Oxygen absorbed by the organic and other oxidisable matters in one million parts of water.

Free and Ureal Ammonia, 0.05 parts per million.

Albuminoid Ammonia, 0.16 parts per million.

These results show the sample to contain undesirable traces of readily-changeable organic matter, apparently of peaty or vegetable origin derived from the gathering ground. The appearance of the water is also attributable to the same cause.

In my opinion, the water would be materially improved by careful filtration.

G. E. SCOTT-SMITH.

November 9th, 1906.

SANITATION, &c.

I have regularly attended the Sanitary Committee, or monthly Council meetings, and read reports on the birth-rate mortality, and general health of the district. I have sent monthly returns of the diseases prevalent in the district to the Medical Officer of the County Council.

I have inspected different parts of the district a various times in the company of the Sanitary Inspector. Visits have, as usual, been made to premises in which infectious disease existed, enquiries made into the circumstances associated with the disease, and verbal instructions given with a view to prevent its spread. Printed instructions as to precautionary measures, legal penalties, and cleansing, &c., were also sent to such houses on receiving notification. In the case of Enteric Fever the ashpits were cleansed and disinfected, and covered pails provided to receive excreta. Action was taken where necessary to remove insanitary conditions associated with infectious disease.

For diagnostic purposes two specimens of blood from suspected cases of Enteric Fever and 13 swabs from throats suspected to be diphtheritic were sent for examination during the year to the Bacteriological Laboratory of the County Council at Wakefield.

I condemned during the year 1 calf, weighing 70 lbs., 70 lbs. of mutton, and three ducks as unfit for human food.

The following directions for the prevention of summer diarrhœa were posted throughout the parish :—

PREVENTION OF DIARRHŒA.

“ This disease is prevalent in summer and causes many deaths annually, especially of children under one year of age.”

“ It is associated with fouling of the soil and air with decomposed animal and vegetable rubbish, stinking privies and ashpits, dirty fowl-houses, pig-styes, &c., want of domestic and personal cleanliness, and contamination of food, especially milk.”

“ It is much more prevalent among, and fatal to, artificially fed than breast fed infants.”

“ It is a preventable disease.”

To do what you can to prevent it the following rules should be observed :—

CLEANLINESS.

“ Keep your house—floors, walls, ceilings, cupboard, pantry, sinks and cellars—and yard scrupulously clean. Burn all animal

and vegetable refuse, and do not allow it or slops to be thrown in the yard, or into the ashpit, which should be kept perfectly dry."

" Report at once to the Sanitary Officers any foul accumulation, choked or smelling drain, or other nuisance."

VENTILATION.

" Have the whole of your house well ventilated by day. Keep the bedroom windows down at the top during the night. See that all fireplaces and chimneys are always open and not covered up with paper, &c., and blocked with old sacks."

FOOD.

" All food should be kept as free as possible from dust and flies, and in a cool, clean, dry, and airy place. Milk should never be left uncovered, and in hot weather should be boiled immediately or soon after being received. Keep all feeding utensils constantly clean and sweet with boiling water. Avoid eating stale fish and tainted meat of all kinds ; also fruit and vegetables in a state of decay."

INFANT FEEDING.

" Mothers should, if possible, suckle infants under one year old, and breast infants should not be weaned, if it can be avoided, in the months of July, August, or September. For artificially fed infants the milk should be brought to the boiling point, put into a clean bottle washed out with bi-carbonate of soda, Condyl's fluid, or borax, and then with boiling water. It should then be stoppered with a clean stopper and kept in a cool place or in cold water. Up to two months old a baby should have one part of milk, two parts of boiled water, and a little sugar. From two or four months, half milk and half boiled water. From four to seven or eight months, two parts milk and one part boiled water. From eight to twelve months gradually increase up to all milk. Babies should not, as a rule, be fed oftener than once every two hours during the day."

" The boat-shaped feeding bottle, with teat directly attached, is much to be preferred to that with the indiarubber tubing. It is better to have two bottles and to keep the one immersed in water and Condyl's fluid, or borax, or some other disinfectant, while the other is in use. Always wash out the bottle with one of these disinfectants, and then with boiling water before refilling it. Do not give the baby a " dummy " teat or other article—not always clean—to suck ; and don't allow children to play near ashpits or other dirty places."

“ These principles should be carried out as far as possible all the year round.”

My report for September contains the following remarks :

“ Complaint has been received of smell proceeding from the Rotherham Sewage Works. With the permission of the Rotherham authorities, I visited the works in company with Councillor Blyth and the Sanitary Inspector. The manager very courteously showed us over all the works, and satisfied us that no offensive smell was proceeding therefrom, in spite of the large quantities of sewage and sludge being dealt with. Without a doubt any smell in that neighbourhood proceeds from the river and canal, which are in close proximity ; the canal especially is in an abominable condition, and a nuisance and danger to the public. I have had occasion frequently of late to walk along its banks to a case of Typhoid at one of the Lock-houses, and can speak feelingly on the subject.”

Earlier in the year the river was in a worse condition than I have ever seen it during the last twenty years. and in warm summer weather it and the canal constitute a serious public nuisance. Fortunately the prevailing winds often carry the smell away from the population. This nuisance is at the southern end of the township, On the eastern side of it is another, the Sheffield sewage tip, concerning which I made the following report in November :

“The Clerk wrote me on October 5th that the Council would be glad to have a report from me as to whether the accumulation of the sludge tip at Kilnhurst was injurious to health.

I think I should quote here what I have already written on this subject.

In consequence of a complaint from a dairyman, who alleged that his dairy produce was getting tainted and his business affected by the smell from the Sheffield sludge tip at Kilnhurst, reported as follows in July, 1902 :

“ In accordance with a resolution of the Sanitary Committee, I yesterday visited the Rawmarsh Sewage Works and Sheffield Corporation Sludge Tip, near Kilnhurst. The sludge deposited at the Rawmarsh Works is much the same kind of material as that at the Corporation Tip, but is almost infinitesimal in amount compared with the latter, and the odour is much less. At Roundwood Farm there was no smell ; the wind at my visit carrying it away from the farm. On interviewing Mr. Cranidge, he stated emphatically that the nuisance he complained of was from the Sheffield

Tip and not from the Rawmarsh Works, and that the offensive smell was carried from the direction of the tip by easterly winds, which conveyed any smell there might be from Rawmarsh Works away from his farm. He said he very seldom experienced any unpleasantness from the Rawmarsh Works."

In July, 1905, I reported that " Serious and urgent complaints have come from different parts of the Parish during the past two or three weeks, of an odour so powerful and offensive as to make some people feel sick, and compel them to close their windows and doors. It was associated with hot weather, and a particular direction of the wind, and Mr. Whitehead and I easily traced it to the Sewage Sludge Tip at Kilnhurst, belonging to the Sheffield Corporation. We visited the Tip on the 27th ultimo. There were at least two acres of foul sewage sludge, fifteen to twenty feet in depth, exposed to the air, and visibly emitting noxious gases."

" Some further action than hitherto should be taken to prevent the recurrence of this nuisance, which must be a danger to the health of the inhabitants."

Since receiving the clerk's letter I have twice visited the tip, both times accompanied by the Sanitary Inspector.

The weather conditions were not favourable to rapid decomposition, and the evolution of gases, and there was very little to complain of in the way of smell.

I think, however, that with weather favourable to decomposition, and with a wind blowing towards Rawmarsh, the inhabitants will again have reason to complain of the tip as a nuisance injurious to health."

DWELLING HOUSES.—The dwelling houses erected during the year were good class cottage houses. Thirty-two were built in Parkgate and twenty in Rawmarsh. All those at Parkgate were provided with w.c.'s., but fourteen of the twenty Rawmarsh houses were provided with privies and ashpits. Twelve of the fourteen were erected in North Street, where there are at present no means of dealing with the sewage of w.c.'s, the sewage from that street flowing into a ditch. The other two were erected in South Street, where the uncertain water supply is a deterrent to builders providing w.c.'s. It is very unfortunate that so many privies and ashpits—abominations anywhere—should be newly built, but the builders had practically little or no option in the matter. Instead

of conditions being such that these nuisances are necessarily multiplied, the Council should consider whether they cannot facilitate, and, as far as possible, compel the provision of w.c.'s to all new houses.

STREETS.—The following streets mentioned last year in my report as requiring attention under Section 150 Public Health Act, 1875, remain as I last reported, viz, : Infirmary Road, Wheatcroft Road, Apollo Street, Bernard Street, Evelyn Street, Osberton Street, Sandhill Road, and Ann Street. Most of these streets are unfit for carriage traffic and have been so for many years. The upper part of France Street was made good during the year,

SEWERS.—The Kilnhurst Road Sewer has been extended from the Queens Hotel to near Lanehead. The new Pottery Street sewer has also been extended to take part of Old Pottery Street sewage, which was previously conducted by a circuitous route. Means for flushing have been provided for this sewer, and an inspection chamber has also been placed in the middle of new Pottery Street. The old rubble sewer, which extended in Bear Tree Road, from Greasbro' Road to Ann Street, has been re-laid with proper sanitary pipes.

An addition was made to the Ashwood Road School, and the drainage system was overhauled and adapted to the new requirements. The Girls' School, Dale Road, has also been re-drained.

NIGHTSOIL, &C., REMOVAL.—This work continues to be efficiently done by the Council's own men under the supervision of the Sanitary Inspector.

SLAUGHTER HOUSES.—These have all been visited and found in good condition. Two are not now in use, and two are used by five butchers. Two have been improved by removing the gullies to outside the slaughter house and re-laying the floors.

COWSHEDS, DAIRIES, &C.—These have all been visited during the year, and found in much the same state as previously reported. One has had extensions made for the provision of greater air space and better means of lighting, and two have had their drainage improved. Printed instructions sent by the County Council Medical Officer to secure thorough cleanliness in the milking of cows were sent to all the cowkeepers.

FACTORY AND WORKSHOPS ACT, 1901.—Details of the character of the workshops under this Act are to be found in my report for 1901. They are all in good condition, and comply with the requirements of the Act. Sanitary conveniences for both sexes have been provided at one factory. The workshops under the Act comprise four dressmakers, three milliners, two shoemakers, two file cutters, two tailors, one joiner, one cabinetmaker, one

printer, four pork butchers, one hosier, two plumbers, and one baker, a total of 24, against 24 for 1905. These are three out-workers in your district, two receiving work from manufacturers in the parish and one from outside. The premises of these out-workers are in good condition, and meet the requirements of the law.

ISOLATION HOSPITAL.

I reported last year that you were again in negotiation with the Wath, Swinton, and North Rotherham Joint Hospital Board with a view to join that Board, if satisfactory terms could be arranged. A sub-committee was appointed, of which I was one, and after detailed information had been received the sub-committee asked me to put it in the form of a report to them. The following is the report, dated May 17th, 1906 :—

At your request I now report on the information received from the Wath, Swinton, and District Joint Hospital Board.

That Board represents the parishes of—

Wath (population in 1901)	..	..	..	..	8515
Swinton	„	..	..	..	12217
Greasbrough	„	..	..	..	3131
Bolton	„	..	..	..	3827
North Rotherham	..	..	..	..	4672
Total Population in 1901					32362

The Capital borrowed is :—

£9000, for 30 years, at $2\frac{3}{4}$ per cent.

750, for 30 years, at $3\frac{1}{4}$ per cent.

1100, for 25 years, at $3\frac{1}{4}$ per cent.

£10850

The Hospital accommodation consists of :—

Scarlet Fever Block	..	..	..	..	12 beds.
Enteric Fever Block	..	..	..	..	8 beds.
Diphtheria	..	..	..	..	4 beds.
Total					24 beds.

The extent of land is 6 acres, 1 rood.

Cost of Land	..	..	..	..	£707
Cost of Buildings	..	..	..	..	6068
Cost of Boundary Wall	..	..	..	..	500
Total cost					£7275

I take it this sum does not include Furnishings, Disinfector, Ambulance, etc., and it equals £303 per head.

The Hospital was opened on May 31st, 1902, and the number of patients admitted to March 31st, 1906, was as follows :—

For the year ending March 31st, 1903	..	..	61
" " 1904	..	..	86
" " 1905	..	..	95
" " 1906	..	..	179
Total	..	..	<u>421</u>

For three years ending March 31st, 1906	..	..	360
Average for these three years	..	..	120

For one month—October 19th to November 20th, 1905—the Hospital was closed for the admission of Scarlet Fever cases—every bed being occupied.

The following are the particulars of the Common Fund expenditure (excluding "Patients' expenses") to March 31st, 1906 :

	£	s.	d.
Fuel, Lighting, and Cleaning	774	4	2
Furnishing, Repairs, and other Expenses of Maintenance	924	0	7
Establishment Charges	310	17	7
Salaries of Officers	632	18	6
Water Supply	106	8	3
Rent, Rates, and Taxes	255	3	11
Repayment of Principal on Loan	1238	2	8
Repayment of Interest on Loans	1313	3	6
Legal Expenses	62	14	5
Cost of New Repairs to Buildings, &c.	530	7	8
Total	<u>6148</u>	<u>1</u>	<u>3</u>

This amount of £6148 is taken as a basis on which you are asked to pay £2000 of the £6000 charged you for admission to the Board. The statement is made that it would have been apportioned as follows had Rawmarsh formed part of the Board since its formation :—

	£
Wath Urban District Council proportion ..	1116
Swinton ..	1573
Greasbro' ..	392
North Rotherham ..	588
Bolton ..	512
Rawmarsh ..	1967
	<u>£6148</u>

This is an entirely inequitable basis, because, if Rawmarsh had formed part of the district from its formation, this sum would have been larger ; and why should Rawmarsh pay any share of establishment expenses incurred solely to meet the wants of the other districts ? You are further asked to pay £4000, or one half the cost of extensions rendered necessary by the addition of Rawmarsh ; although, in reply to questions, the Board state you would contribute only 31 per cent., or less than one-third of the whole Hospital District, and they have not yet fully considered what extensions would be necessary. It appears, however, they expect to spend £8000 if Rawmarsh join them. Are they likely to give you £8000 worth for six ? If not, then you will probably pay for your own requirements, plus one-half of extensions now needed for the Board's District as at present constituted. £8000, at the rate of £300 per bed, would provide other 26 beds, which would make a total of 50. Your share of these, according to population, would be about 16 beds. Rotherham Isolation Hospital cost £298 per bed, everything included ; and at that rate you could provide independently for your own District 20 beds for £6000.

For three years, ending March 31st, 1906, the general expenses of the Board, including " Patients' expenses," have been as under :

	£	s.	d.
Patients' Expenses	2774	1	8
Fuel and Lighting	620	4	2
Furnishing, Repairs, and other Expenses of Maintenance	436	16	10
Water Supply	86	4	10
Establishment	115	0	11
Salaries of Officers	367	8	6
Repairs to Buildings	106	12	5
Legal Expenses	62	14	5
Rent, Rates, and Taxes	223	17	4
Repayment of Loans	806	4	4
Interest on Loans	820	15	2
Miscellaneous	2	4	6
Total	6422	5	1

" Patients' Expenses " include the cost of drugs, disinfectants, conveyance of patients to the Hospital, rations of patients, and rations and salaries of staff.

To put this more briefly :—

	£	s.	d.
Interest and Repayment of Loans for the three years, ending March 31st, 1906	1627	0	0
" Patients' Expenses "	2774	0	0
" Establishment " Expenses	2021	0	0
Total Expenditure	£6422	0	0

Taking the average annual number of patients admitted during these years, it shows :—

	£	s.	d.
Average annual "Patients' " and "Establishment Expenses	1598	0	0
Average annual "Patients' " Expenses	924	0	0
Average annual "Establishment " Expenses	673	0	0
Average cost per Patient in "Patients' " and "Establishment " Expenses	13	6	4
Average Cost per Patient in "Patients' " Expenses	7	14	1
Average Cost per Patient in "Establishment " Expenses	5	12	3

The Cost per Patient per day is stated to be for the half-years ending :—

	£	s.	d.
September 30th, 1902	0	9	5
March 31st, 1903	0	4	5
September 30th, 1903	0	5	1
March 31st, 1904	0	4	2
September 30th, 1904	0	5	10
March 31st, 1905	0	4	9
September 30th, 1905	0	3	2

This equals an average of 5/3 per Patient per day for the whole period. I do not know whether these figures are based on "Patients' " Expenses only, or on "Patients' " and "Establishment " Expenses.

I am indebted to the Clerk for the following details of Expenditure of Rawmarsh Isolation Hospital, for the three years ending March 31st, 1906 :—

	£	s.	d.
Rates	11	0	0
Coal and Coke	37	4	9
Insurance	5	7	6
Food and Drugs	160	14	4
Repairs (including New Wash house)	115	7	2
Carriage and Carting	6	5	6
Gas	9	16	10
Fittings	7	16	11
Disinfectants	6	10	9
Horse Hire	4	2	6
Miscellaneous	13	2	6
Wages	135	8	9
Nursing and Food for Nurses	259	10	5
Total	£772	7	11

This sum includes £41, the cost of isolating three cases of smallpox and 19 contacts ; compensation to the latter for loss of wages, and cleansing and disinfection of the houses.

The following table shows the Expenditure, underneath the same heads, of the two Hospitals, for the three years ending March 31st, 1906 :—

	Wath, Swinton and District Joint Hospital.				Rawmarsh Hospital.			
Number of Patients admitted ..	360				78			
Average	120				26			
	£	s.	d.		£	s.	d.	
Average annual "Patients' " and "Establishment " Expenses ..	1598	0	0	..	257	10	0	
Average annual "Patients' " Ex- penses	924	0	0	..	143	0	0	
Average annual "Establishment " Expenses	673	0	0	..	113	16	0	
Average Cost per Patient in "Patients' " and "Establish- ment " Expenses	13	6	4	..	9	18	0	
Average Cost per Patient in "Patients' " Expenses ..	7	14	1	..	5	10	5	
Average Cost per Patient in "Es- tablishment " Expenses ..	5	12	3	..	4	7	6	
Cost per Patient per day, September 30th, 1902, to September 30th, 1905	0	5	3	..	—			
Cost per Patient per day, March 31st, 1903, to March 31st, 1906					0	4	2 $\frac{1}{4}$	
Do., Less Cost re Smallpox Cases					0	3	11 $\frac{3}{4}$	
Do., Less Smallpox Cases and building Wash-house					0	3	9 $\frac{1}{4}$	

I do not wish to suggest by these figures that you could manage an up-to-date Hospital as cheaply as you do your present one, but they show a substantial balance in favour of Rawmarsh, and may help you to form an opinion as to whether you are likely to isolate as economically in a new Hospital of your own as at Wath Wood Hospital.

Let me quote here from my report of 1903 on your proposal to combine with Rotherham for Hospital Isolation purposes :—

“It is easy to give theoretical reasons why ‘Establishment’ expenses should be proportionately less in large than in small Hospitals, but I believe in practice it is not found to be so. The detail required in a large Hospital is out of proportion to that in a small one, and it is much more difficult to control expenditure in a large than in a small one. In a large one there are greater possibilities for leakages in expenditure, while in a small one there are ways of economising, not open to the management of a large one. This question of management is, therefore, a most important one.

“In a long list of General Hospitals given in ‘Burdett’s Hospitals and Charities, 1902, the number of beds varying from 14 to 242, the cost per patient per day is given as varying from 2/2 and 2/9 in a 37 and 14 bed hospital respectively to 6/8 in a 82 bed one. Indeed, the figures indicate that in actual practice, the number of beds has little or nothing to do with this cost, which must, therefore, depend on other circumstances, and especially management in the erection and maintenance.”

Of course, the financial aspect of the question, although important, is not the only one to be carefully considered. Other things being equal, I am ready to admit there may be advantages, from a preventive point of view, in having these institutions, few in number, centralised, and providing for a wide district, rather than numerous, small, and providing for a more restricted area. But it appears impossible to get these equal conditions, and the neighbouring districts have not considered the good of the community as a whole, but what was for their own benefit. It appears to me that you are, therefore, compelled either to join one of these districts at a sacrifice to your own, or to follow their example, and act on the principle that “Charity begins at home.”

The following are some of the advantages of having a Hospital of your own :—

- 1st. Complete control.
- 2nd. You would not necessarily require a medical officer to attend the patients, and be paid by the Council for such attendance.
- 3rd. No drug bill.
- 4th. Parents would allow their children to be removed more readily because :—
 - (a) The Hospital would be near home.

(b) Their children could be attended by their own doctor.

(c) They could more easily enquire personally after, and even see their children.

5th. The greater the proportion of cases isolated, especially at the beginning of an outbreak, the more likely is an epidemic prevented, and thus expenditure as well as disease lessened.

On the presentation of this report negotiations with Wath, Swinton, and North Rotherham Joint Hospital Board ended. Plans are now in course of preparation for an Isolation Hospital for your own district.

RECOMMENDATIONS.

1st.—The erection of a destructor for the disposal of nightsoil and rubbish. The question of providing a tip for Rawmarsh district is now engaging your attention. Before proceeding with any scheme which may entail considerable expense in buying land, &c., for providing a tip for a long series of years, I think you should take steps to get all the information possible re a destructor. I regard it as a very serious matter to plan for depositing all the noxious material from Rawmarsh at one tip for a period of 20 or 30 years comparatively near a growing population without even considering the alternative method.

2nd.—The provision of water closets to all new dwelling-houses and the gradual conversion of privies into w.c.'s.

There are now 667 w.c.'s in Parkgate, and 290 in Rawmarsh, a total of 957 for the parish. Eleven privies were converted into w.c.'s in Parkgate and six in Rawmarsh, and 52 and six new ones were built in these districts respectively during the year. The process of conversion is too slow.

3rd.—The paving of all old, dirty, insanitary backyards in accordance with bye-law 7 of your bye-laws passed in 1900.

Some of these yards should be entirely paved or asphalted ; other very large common yards should at least be covered periodically with ashes or gravel of some kind.

4th.—The adoption of improved bye-laws under the 44th Section of the Public Health Act, 1875, which deals with the following :—

SECTION 44.—The prevention of nuisances arising from snow, filth, dust, ashes, and rubbish ; and for the prevention of the keeping of animals on any premises so as to be injurious to health.

6th.—(a) The adoption of bye-laws under the 26th Section of the Public Health Acts amendment Acts, 1890, which deals with the following matters :—

- (a) Prescribing the time for removal of offensive matter through streets, whether from within, without, or through the authorities' district.
- (b) Providing that receptacles, carts, &c., shall be properly constructed and covered.
- (c) Compelling cleansing of any place where such matter has been spilt or dropped in removal.
- (d) Imposing duties on the occupier of premises in connection with removal of house refuse, so as to facilitate such work when the local authority undertakes or contracts for it.

Accompanying this report are Tables I., II., III., IV., and V. supplied by the Local Government Board ; a Table from the Home Office in connection with the Factory and Workshop Act, 1901 ; Table C, supplied by the Medical Officer of the County Council, and the Annual Reports of the Sanitary Inspector and the Surveyor.

JAMES PICKEN.

Parkgate, March 9th, 1907.

RAWMARSH URBAN DISTRICT COUNCIL.

ANNUAL REPORT OF INSPECTOR OF NUISANCES, 1906.

GENTLEMEN,—

During the year, 1906, I have reported at the monthly meetings of the Sanitary Committee, that letters and notices have been served for the abatement of the following nuisances in accordance with the Public Health Acts.

Choked Drains	...	...	...	...	...	46
Defective Privies and Ashpits	...	...	...	...	...	15
Defective Drains	...	...	...	...	...	11
Defective Sinks and Sink Pipes	...	...	...	...	...	7
Pave or Asphalt Yards	...	...	...	...	...	7
Choked W.C.	...	...	...	...	...	6
Defective Spouting, Fall Pipes and Conductors, causing wet, damp dwellings	...	...	...	...	...	6
Defective Sanitary Conditions on Club Premises	...	...	...	...	...	5
Repair Dangerous Buildings	...	...	...	...	...	5
Accumulation of Water in Ashpits	...	...	...	...	...	4
Defective W.C. Fittings	...	...	...	...	...	3
Insufficient Privy Accommodation	...	...	...	...	...	3
Keeping Pigs so as to be Nuisance	...	...	...	...	...	3
Defective Walls of Houses, causing wet, damp rooms	...	...	...	...	...	3
Overcrowding	...	...	...	...	...	4
To Remove Offensive Accumulations	...	...	...	...	...	2
To Cleanse and Whitewash Dwelling-houses	...	...	...	...	...	2
Percolation and Accumulation of Sewage in Cellars of Dwellings	...	...	...	...	...	2
Insanitary Condition of Registered Dairy	...	...	...	...	...	1
To Properly Drain Farm Yard and Cowsheds	...	...	...	...	...	2
To Provide proper Ashpit for Dwelling-house	...	...	...	...	...	2
Defective Chimney, Making House Unhabitable	...	...	...	...	...	2
To provide Separate W.C. Accommodation at a Factory for Male and Females	...	...	...	...	...	1
						142
In Hand Last Year	...	...	...	...	...	11
						153
						Letters and Notices.
Of these have been completed	...	...	...	...	...	139
In Hand or Promised Attention	...	...	...	...	...	14
						153

DRAINAGE.

Defective Drains have been remedied or relaid in Victoria road, Dale street, Lloyd street, Goosebutt street, Aldwarke road, Craven yard, Dale Road Schools, Stanley street, Parkgate Offices, 72, Bear Tree road; South street, Ryecroft; George Inn, High street, Main street, Ryecroft (Co-operative Houses).

Five new W.C.'s have been substituted for five Privies, serving 10 houses.

Parkgate Office, Laboratories and Lavatories have been connected to Council's sewer, Rotherham road. New Drainage system has been laid to Dale road Girls' School, and School House, in consequence of drains having been severed by Tramway Company in laying the Tramway Cables in footpath.

The Sewer in old Pottery street has been extended with means of flushing said sewer; also Inspection Chamber in new Pottery street.

There are now 667 W.C.'s, serving 716 houses and schools on the Parkgate sewer outfall, and 290 W.C.'s, serving 356 houses and schools on the Rawmarsh sewer outfall; total 957 W.C.'s, 1072 houses.

Spalton road, top portion of Goosebutt street and Netherfield road have been made to discharge in Albert road sewer. In consequence of houses being flooded with sewage in Goosebutt street. Portion of an old rubble sewer has been taken out High street and houses connected to pipe sewer.

Houses in Clay Pit lane were flooded with sewage. On the sewer being exposed, it was found to be a piece of broken pipe crossway of the sewer.

COWSHEDS AND DAIRIES' ORDER, 1885.

		Cow keepers.	Purveyors and Darymen.	Total.
There were on the Register, 1905	...	16	...	15
Registered during 1906	...	—	...	1
		—	—	—
		16		16
				32

I have visited the Cowsheds at intervals during the year, causing removal of manure from yards where required.

The Regulation for Milkers and Cleanliness of Cowsheds issued by the County Council Medical Officer of Health, were given to every cowkeeper in the district. One cow in one cowshed showed emaciation, and a veterinary surgeon made examination test with tuberculin, but which did not act. The cowkeeper isolated the cow on the advice of Dr. Picken, Medical Officer of Health. The animal continuing to waste, was taken to the knacker's yard and destroyed.

Two cowsheds have been properly drained during the year.

SLAUGHTER-HOUSES.

					Slaughter-houses.
There were on Register, 1905	...	...	...	...	17
Not being used	...	...	...	...	2
					—
Now on Register in Occupation	...	...	...	...	15

The two Slaughter-houses not now in use are in consequence of two butchers giving up business. We have two slaughter-houses used by five butchers.

I have visited them frequently, and the Bye-law as to cleansing has been fairly kept. Two Slaughter-houses have been improved by taking gully outside said Slaughter-houses, and floors relaid at my suggestion.

NOTIFICATION OF INFECTIOUS DISEASES.

There has been notified during 1905:—

150 persons suffering from Scarlet Fever in 112 houses.

9 persons suffering from Enteric Fever in 9 houses.

24 persons suffering from Erysipelas in 24 houses.

13 persons suffering from Diphtheria in 13 houses.

196 persons suffering in 157 houses.

One notification was given in duplicate, two medical men attending, but not at the same time.

They were located as follows:—

	Scarlet Fever.		Enteric Fever.		Erysipelas.		Diphtheria.	
Ward.	P.	H.	P.	H.	P.	H.	P.	H.
North	64	42	1	1	4	4	5	4
Central	36	30	..	..	4	4	11	1
West	25	18	1	1	5	5	4	4
East	21	18	3	3	4	4	2	2
South	4	4	4	4	7	7	1	1
	150	112	9	9	24	24	13	12

In two fatal cases of Enteric Fever, bedding has been destroyed on certificates of medical attendant, and compensation given amounting to £1 6s. 3d. Bedding was also destroyed in two other deaths of a non-infectious nature, but no compensation was given.

HOSPITAL.

There has been removed to Hospital during 1906, 85 persons suffering from Scarlet Fever from 58 houses.

Taken from North Ward,	37 Patients in 22 Houses.
Central Ward,	18 Patients in 14 Houses.
West Ward,	14 Patients in 10 Houses.
East Ward,	15 Patients in 11 Houses.
South Ward,	1 Patients in 1 House.

85

58

Ranging from 39 years old to 2 years old. Four deaths occurred in Hospital.

Twenty-seven houses have been fumigated, whilst white-washing and Cleansing have been enforced in every case possible. Disinfectants have been distributed gratis with printed instructions and precautions to every house. Ashpits have also been specially cleansed and disinfected when Enteric Fever notified, pails being supplied which were changed as required. The yards at Hospital have been asphalted.

VISITATION.

I have visited the yards and premises of 850 houses during the year, including 27 visits specially to Slaughter-houses, 23 to Cowsheds, and 16 to workshops.

I destroyed on magistrates' order, one calf, 70lbs. weight, 70lbs. of Beef and Mutton, which was unfit for food; also 3 ducks were submitted for inspection, and destroyed as also unfit for food.

FOOD ANALYSIS.

Seven samples of Milk have been taken and submitted to the County Analyst, six of which were reported to be "all genuine."

' One sample had been deprived of a portion of its natural "fat by skimming or similar treatment. It contains fourteen-fifteenths of the minimum proportion of fat (that is 3 per cent.), "natural to genuine new milk, and required by Board of Agriculture." These were taken in accord with arrangements with County Council, who wrote a letter cautioning the vendor of said milk.

I also submitted 10 samples of water, as supplied by the Rotherham Corporation in this Council's district to F. W. Richardson, Esq., West Riding County Analyst, Bradford.

Two samples, the bottles were broken in transit on Railway.

Two samples of water I submitted to Messrs. Allen and Co., by order of Council, to ascertain if pollution of water occurred before entering this district or in Rotherham district, and the result is referred to in Dr. Picken's Medical Officer report.

I have visited the Sheffield Sewage Tip at Kilnhurst at intervals, in company with Dr. Picken, Medical Officer of Health, and members of the Council, and also by myself, in consequence of the complaint of bad smells in our district therefrom. Lime has since been freely used on the surface of said deposits, but such large deposits of filth that are there made are a menace to the health of any community with given conditions.

I also visited, by permission, the Sewage Works of Rotherham Corporation, as requested by resolution of the Council, and presented the following report to Council at its next meeting in October.

In company with Dr. Menzies, Deputy Medical Officer of Health, and Councilor J. D. Blyth, I visited Rotherham Sewage Works on September 25th, as per resolution of Council, having obtained permission from Town Clerk. We found the works in working order. There were two lagoons of sludge, about 18 inches deep, which had been recently pumped from the Settling Tanks calculated to be about 4 to 500,000 gallons of sludge. These lagoons were emptied about May last, 250 loads of which sludge had been deposited on the meadows near Aldwarke Wash for tillage purposes. I saw nothing of any great danger in my opinion to the health of Rawmarsh and Aldwarke; portions of the borough are in much closer contact than Rawmarsh. The working of the works are on modern lines, and the Sewage Manager, who treated us very courteously, informed us they intended to put down more Bacteria Beds similar to the one shewn us with Automatic Sprinklers, and which were turning out a good effluent. No chemicals whatever are in use ordinarily.

REFUSE DISPOSAL.

There has been removed during 1906:—

Loads.	Middens.	Privies.	Nights.	£	s.	d.
6091 from 2792	...	5679 in 286,	costing for labour	472	19	0
1517	„	1297 dry ashpits				
604 rubbish from yards and shops			...	...	161	9 0
<hr/>						
8212 loads	4089 ashpits	5679 privies	.			
		Trenching land at tips	...	...	95	10 0
				<hr/>		
				£729 18 0		

There has been deposited on land ... 1941 loads.
 There has been deposited on tips ... 6271 loads.

8212

	s.	d.
The average cost per load has been, Day Work	1	6 $\frac{1}{4}$
An average cost per load has been, Night Work	1	6 $\frac{3}{4}$

There is an increase number of loads removed during the year, consequent on increased number of houses built, mainly with W.C.'s.

The tip at Meadow Works is practically finished for deposit, and tenancy expires March 31st.

Three-fourths of the refuse made has to be taken to tips, and I am thoroughly convinced if a destructor could be erected in a fairly central position to serve Rawmarsh and Parkgate, this material, after being made innocuous by burning, could be utilised for various purposes, instead of dumping foul stinking material breeding disease years after deposit.

At present no arrangement is made, and it appears extra cartage will be required to bring Rawmarsh refuse into the Parkgate district, which will be very undesirable, but it will only hasten some more desirable way of disposal than by dumping on subsided land.

The Sanitary Department have earned:—	£	s.	d.
By Changing Fever Pails 	7	10	0
Removal of Fish Offal 	8	9	0
Carting for Infectious Hospital 	2	14	0
	<hr/>		
	£18	13	0

JAMES WHITEHEAD,

Inspector of Nuisances.

RAWMARSH URBAN DISTRICT COUNCIL.

SURVEYOR'S ANNUAL REPORT,

For the Year ending December 31st, 1906.

TO THE CHAIRMAN AND MEMBERS OF THE RAW-
MARSH URBAN DISTRICT COUNCIL.

GENTLEMEN,

I beg to present my Annual Report on the work executed in the Surveyor's Department during the past year. There are 86 streets in the Urban District of Rawmarsh. The number of miles of Highways repairable by this Council within the District is as under, viz. :—

	Miles.	Yards.
Main Roads	4	20
Roads and Streets, other Roads	11	382
	<hr/>	<hr/>
Total	15	402

	Miles.	Yards.
Footpaths: On Main Roads ...	3½	415
„ On other Roads ...	11½	283
	<hr/>	<hr/>
Total	15	696

	Miles.	Yards.
Public Footpaths through Fields in the District	12¼	358

On the main road, Rotherham and Swinton Road from Little Bridge to the boundary at Warren Vale, the sides of the road have been pitched where required with cinder pitching, and the road sheeted with 2¼in. blue granite.

On the main Road, Brampton Bierlow Road, several long lengths of Road has been sheeted with 2½in. broken grey cinders.

Other Roads and Streets have been repaired with 2½in. broken grey cinders.

The Public Footpaths through fields have been, from time to time, repaired with engine ashes.

RAWMARSH TRAMWAYS.

The Tramway Track through the district is completed, and the Power Station built.

Permission for running the Cars on the section of the route from the Power Station, Dale Road, to College Square was sanctioned by Col. Pringle (Board of Trade Inspector) on February 1st, 1907, and Tram Cars commenced running from Holly Bush Street to College Square on February 2nd, 1907.

977 super yards of Norwegian granite sett paving has been laid for this Council on the Main Road at the sides of the Tramway Track at several places, extending from Rotherham Road Bridge as far as the Boys' School in Dale Road, at a cost of £708 16s.

COUNCIL OFFICES.

Painting, colouring, and decorating has been done at the Council Offices, at a cost of £38 8s. Part of the boundary wall at the Council's yard has been raised.

STREET IMPROVEMENTS.

Kilnhurst Road (Lane Head) has been lowered 18 inches, and the kerb and footpath raised.

Dale Road, near the Power Station, has been widened and 120 lineal yards of post and rail fencing fixed.

In Dale Road, 74 lineal yards kerb and channel have been laid opposite new wall. Iron railings have been removed at Rotherham Road Bridge; and post and rail fencing fixed on the East side, and the roadway under the Bridge has been lowered.

57 lineal yards of new footpath has been made from Rotherham Road Bridge to the Flying Dutchman public-house.

On the Main Road alterations have been made to the levels of the footpaths, and kerbs and channels have been taken up and relaid in Broad Street, Rawmarsh Hill, and High Street, at a cost of £39 10s.

New sett crossing has been laid at the junction of Broad Street and Greasbro' Road. The iron railings at Ryecroft footpath have been taken up, the path widened to six feet, and the railings refixed.

Brick fence wall has been built in Dale Road at a cost of £45 10s.

Retaining and fence wall has been built near the Power Station, Dale Road, at a cost of £23 16s.

Wood bridge has been repaired on the footpath over boundary dyke, Kilnhurst. The Iron Urinals in Aldwarke road, and Stocks lane have been painted.

ADOPTED STREETS.

Rosehill road, Rawmarsh, length 240 lineal yards.

France street, Parkgate, length 172 lineal yards.

Maurice street, Parkgate, length 22 lineal yards.

FOOTPATHS ASPHALTED.

Tar asphalting has been made and used in asphalting and repairing footpaths in the undermentioned places :—

298	super yards,	Aldwarke road to Holly Bush street.
127	super yards	near Rotherham Road Bridge.
615	super yards,	Taylor's lane to Healey's shop.
418	super yards,	Hospital yard.
317	super yards,	Ryecroft footpath, Dale road.

Total 1775 super yards.

Other footpaths have also been repaired with asphalte in various parts of the district.

STEAM ROLLER.

The Council's Steam Roller Engine has been repaired, the laggins taken off the boiler, the boiler plates inspected, and the laggins renewed. One wheel has been repaired with steel plates.

The Steam Roller has worked during the year			
upon the highways	...	...	147½ days.
Hired out to Contractors, etc.	...	...	6 „
Employed at Depot Cutting Chop	...	...	5½ „
Total			159 „

STREET CLEANSING.

The expenditure on labour and carting on Street Cleansing other roads from January to December, 1906, has been £100 1s. 5d., and for the same period in 1905, the cost was £139 14s. 5d.

SEWERS.

The entrances to No. 14 manholes have been altered on the Sewers from Rotherham Road Bridge to opposite Quarry street, Dale road, at a cost of £31 10s.

85 lineal yards of 12in. diameter sewer has been laid in Albert street.

155 lineal yards of 12in. diameter sewer in Kilnhurst road, at a cost of £92 3s.

142 lineal yards of 9in. diameter Sewer in Stubbin lane.

105 lineal yards of 12in diameter Sewer in Bear Tree road.

The District Sewers have been flushed periodically, the Manholes cleansed, and the Sewage Screen Chambers cleansed.

New Storm Water Drains have been laid in Dale road, and in Rawmarsh Hill, near the Free Church.

Old Rubble Sewer has been taken up in Bear Tree road, Rawmarsh Hill, and High street.

122 lineal yards of 9in. Storm Water Drain has been laid in Rawmarsh Hill.

NEW CEMETERY, HAUGH ROAD.

A new Cemetery, 10a. 1r. 13p. in extent, and for which sanction has been obtained to borrow £6000, is being laid out in Haugh road. The cost of the land was £2082 10s.

The boundary walls are built; also the Cemetery keeper's house, part of the Chapels, etc., are built.

SEWAGE DISPOSAL WORKS (ROUNDWOOD).

The Gas Engine has been repaired by Messrs. T. A. Ashton, and is in working order.

The Sewage ironwork at the Tanks has been painted with black varnish.

Hedges have been cut and laid.

Two new Settling Tanks, with Screen Chambers; 4 Bacteria Beds, 3 Sludge Tanks, one Storm Water Filter Bed have been constructed, at a cost of £2359.

Beds have been made on each side of the old Settling Tanks, and Trees and Shrubs planted.

Ashes and Clinkers have been riddled and carted to Outfall Works, ready for filling the Storm Water Filter Beds.

ALDWARKE PUMPING STATION.

The Gas Engines have been thoroughly repaired by Messrs. Tangye's, and new Cylinder, Piston Rod, and new Pump Rods supplied and fixed, at a cost of £115 15s. 9d.

The Sewage ironwork at Tanks has been painted with black varnish.

New wood teeth have been replaced in the cog wheel of Gas Engine.

DILKS' ROAD PUMPING STATION.

The slating of roof of building has been repaired.

A door and frame has been fixed on the south side of building to obtain access to the Tank and Pump Well.

NEW BUILDINGS.

New Houses and Buildings, under construction, have been visited, and I have, from time to time, inspected all drains and sewer connections in connection therewith.

Number 26 plans have been submitted and approved, viz:—

- 13 plans for 68 new houses.
- 2 additions to Schools.
- 2 additions to Public-houses.
- 8 plans for Alterations.
- 1 plan, new Cemetery and Chapels.

Total 26

In 1906, 52 new houses have been built and occupied, additions made to two schools, one public-house, and additions made to two houses.

VICTORIA PARK, ROSEHILL.

The Park has been kept in order, beds dug and manured, hot beds made, flowers planted and watered, cuttings pricked out, grass borders edged, walks swept, lawns rolled, fruit trees pruned, and a temporary propagating pit has been made.

STABLES AND DEPOT.

Two additional horses should be purchased for the Highway Department. We have now only one horse.

Carts, Water Carts, and Tumblers have been repaired and painted.

A wood ventilator has been made and fixed on roof of stable over hay loft.

A new Water Cart is badly required, one being worn out.

TOOLS AND MATERIALS.

I have taken stock of tools and materials in March, 1906, and have entered the same in the Stock Account Book.

OFFICE WORK, PLANS AND SPECIFICATIONS.

The following Plans and Specifications have been prepared by the Surveyor:—

Plan of Retaining and Boundary Wall, Dale road.

Plan of Cupboards, Clerk's Office.

Plan of Road under Rotherham Road Bridge.

Plan of Manhole on Sewer, Bear Tree road.

Plan and Section of Sewer, Bear Tree road.

Plan and Section of Sewer, Albert road.

Plan and Section of Sewer, Kilnhurst road.

Plan and Propagating House Park.

Plan and Wood and Sett Paving, Rawmarsh Hill.

Plan and Roof Ventilator for Stable.

Tracing of Wall, Dale road.

Tracing of Cupboards, Clerk's Office.

Tracing of Sewer, Kilnhurst road.

Specifications for Walls, Dale road.

Specification for Painting, etc., at Offices.

Specification for Painting, etc., at Cemetery.

Specification for Painting Carts and Urinals, etc.

Specification for Propagating House Park.

I am, gentlemen,

Your obedient servant,

JOHN BOURNE,

Surveyor.

Member Liverpool Engineering Society,
Member Incorporated Association Municipal
and County Engineers.

